



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2018 – 12:47 am GMT

PDB ID : 3AZH
Title : Crystal Structure of Human Nucleosome Core Particle Containing H3K122Q mutation
Authors : Iwasaki, W.; Tachiwana, H.; Kawaguchi, K.; Shibata, T.; Kagawa, W.; Kurumizaka, H.
Deposited on : 2011-05-25
Resolution : 3.49 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : trunk30967
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)
Refmac : 5.8.0158
CCP4 : 7.0 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk30967

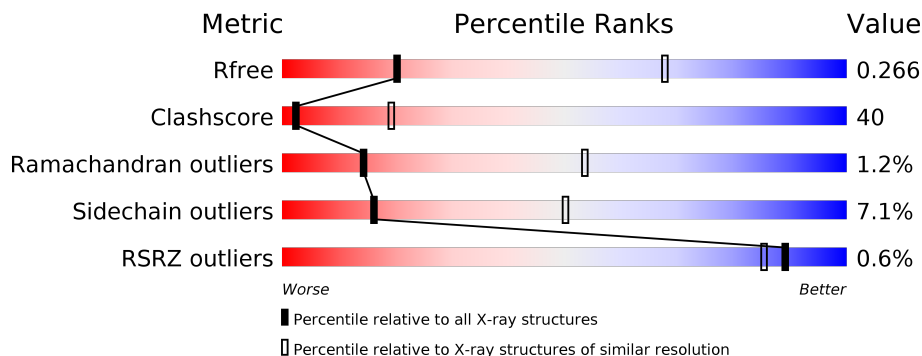
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.49 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



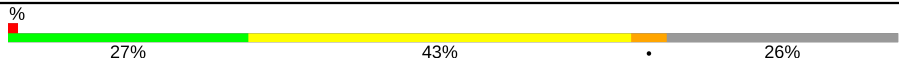
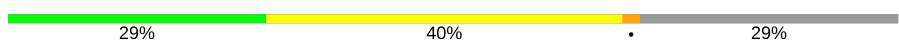
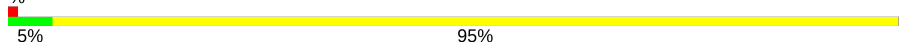

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	111664	1391 (3.60-3.40)
Clashscore	122126	1485 (3.60-3.40)
Ramachandran outliers	120053	1446 (3.60-3.40)
Sidechain outliers	120020	1447 (3.60-3.40)
RSRZ outliers	108989	1303 (3.60-3.40)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	139	
1	E	139	
2	B	106	
2	F	106	
3	C	133	
3	G	133	

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Mol	Chain	Length	Quality of chain
4	D	129	
4	H	129	
5	I	146	
5	J	146	

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 11956 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Histone H3.1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	97	801	504	155	138	4	0	0	0
1	E	99	816	513	158	141	4	0	0	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-3	GLY	-	EXPRESSION TAG	UNP P68431
A	-2	SER	-	EXPRESSION TAG	UNP P68431
A	-1	HIS	-	EXPRESSION TAG	UNP P68431
A	122	GLN	LYS	ENGINEERED MUTATION	UNP P68431
E	-3	GLY	-	EXPRESSION TAG	UNP P68431
E	-2	SER	-	EXPRESSION TAG	UNP P68431
E	-1	HIS	-	EXPRESSION TAG	UNP P68431
E	122	GLN	LYS	ENGINEERED MUTATION	UNP P68431

- Molecule 2 is a protein called Histone H4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	78	619	391	120	107	1	0	0	0
2	F	84	678	428	135	114	1	0	0	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-3	GLY	-	EXPRESSION TAG	UNP P62805
B	-2	SER	-	EXPRESSION TAG	UNP P62805
B	-1	HIS	-	EXPRESSION TAG	UNP P62805
F	-3	GLY	-	EXPRESSION TAG	UNP P62805

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Chain	Residue	Modelled	Actual	Comment	Reference
F	-2	SER	-	EXPRESSION TAG	UNP P62805
F	-1	HIS	-	EXPRESSION TAG	UNP P62805

- Molecule 3 is a protein called Histone H2A type 1-B/E.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	C	106	819	517	160	142	0	0	0
3	G	104	805	508	157	140	0	0	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	-3	GLY	-	EXPRESSION TAG	UNP P04908
C	-2	SER	-	EXPRESSION TAG	UNP P04908
C	-1	HIS	-	EXPRESSION TAG	UNP P04908
G	-3	GLY	-	EXPRESSION TAG	UNP P04908
G	-2	SER	-	EXPRESSION TAG	UNP P04908
G	-1	HIS	-	EXPRESSION TAG	UNP P04908

- Molecule 4 is a protein called Histone H2B type 1-J.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	D	95	745	468	136	139	2	0	0	0
4	H	92	719	453	129	135	2	0	0	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	-3	GLY	-	EXPRESSION TAG	UNP P06899
D	-2	SER	-	EXPRESSION TAG	UNP P06899
D	-1	HIS	-	EXPRESSION TAG	UNP P06899
H	-3	GLY	-	EXPRESSION TAG	UNP P06899
H	-2	SER	-	EXPRESSION TAG	UNP P06899
H	-1	HIS	-	EXPRESSION TAG	UNP P06899

- Molecule 5 is a DNA chain called 146-MER DNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
5	I	145	2970	1421	538	867	144	0	0	0
5	J	145	2969	1421	535	869	144	0	0	0

- Molecule 6 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	G	1	Total 1	Cl 1	0	0
6	C	1	Total 1	Cl 1	0	0
6	E	1	Total 1	Cl 1	0	0

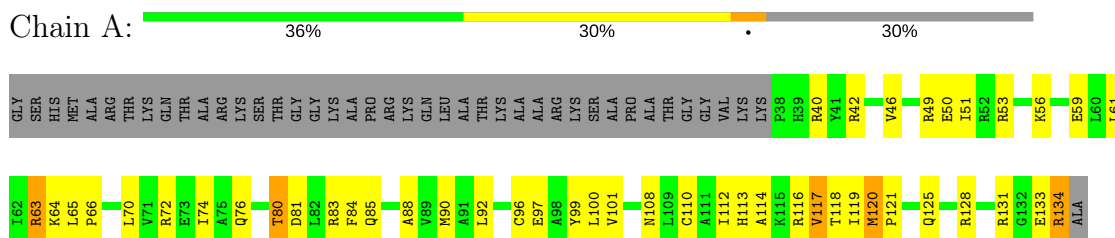
- Molecule 7 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	J	5	Total 5	Mn 5	0	0
7	I	6	Total 6	Mn 6	0	0
7	D	1	Total 1	Mn 1	0	0

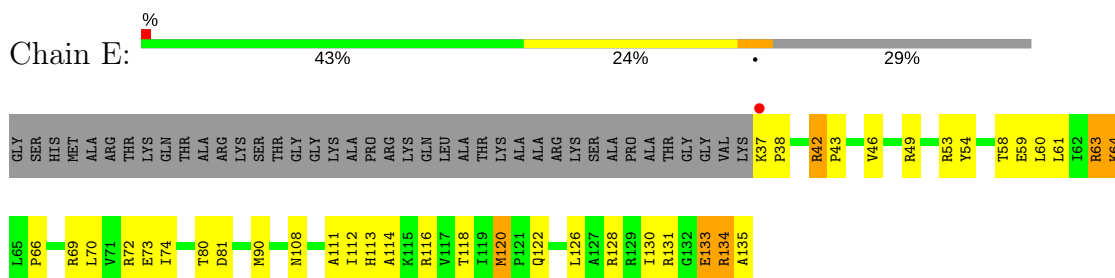
3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

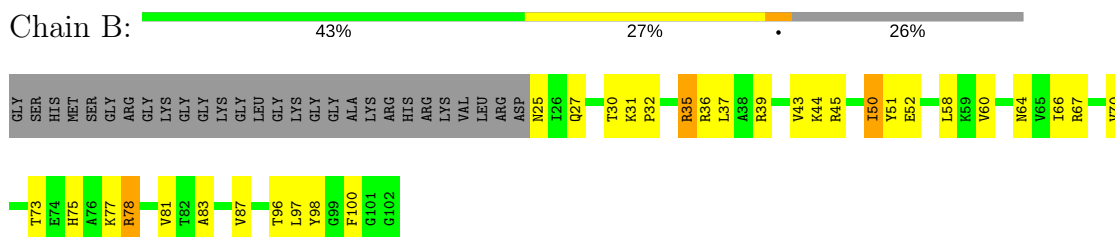
- Molecule 1: Histone H3.1



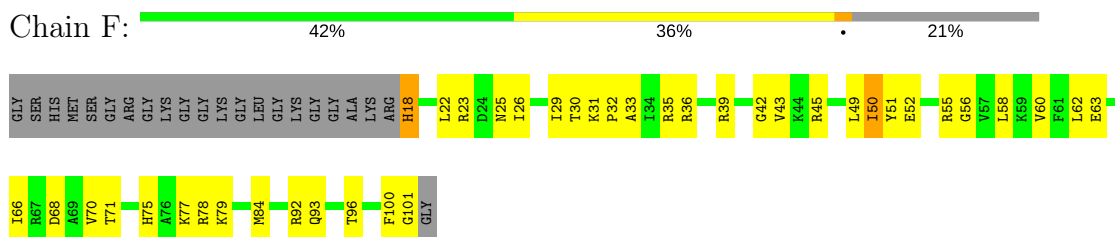
- Molecule 1: Histone H3.1



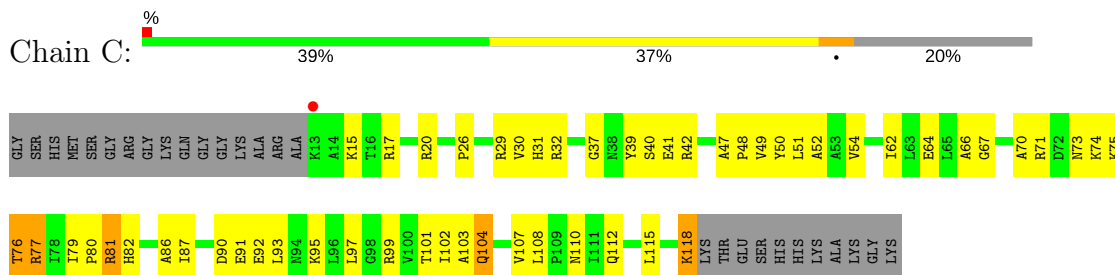
- Molecule 2: Histone H4



- Molecule 2: Histone H4



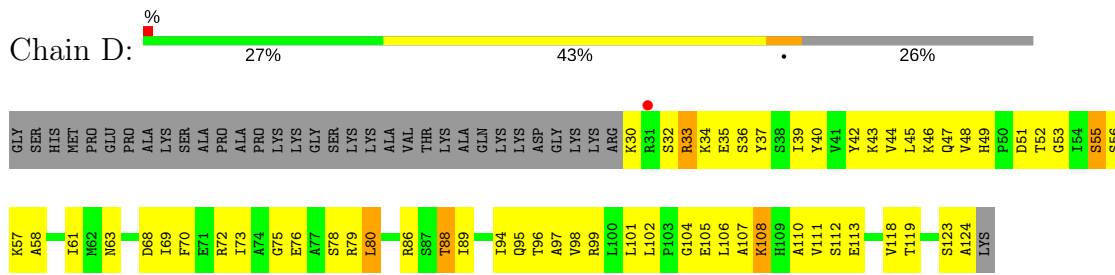
• Molecule 3: Histone H2A type 1-B/E



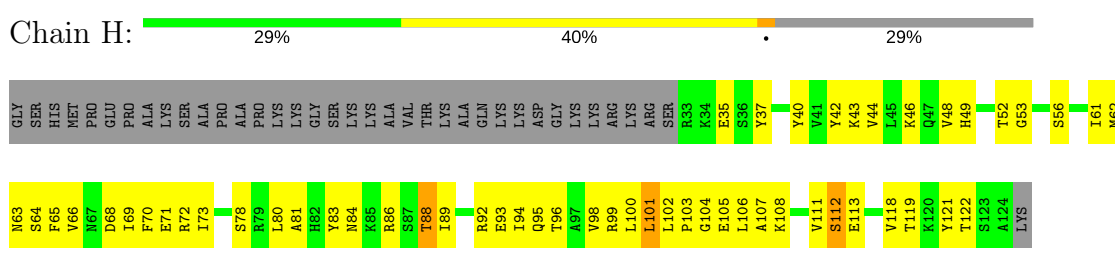
• Molecule 3: Histone H2A type 1-B/E



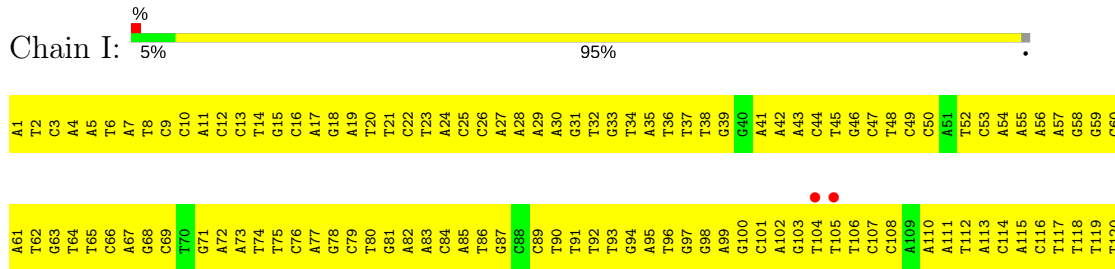
• Molecule 4: Histone H2B type 1-J



• Molecule 4: Histone H2B type 1-J



• Molecule 5: 146-MER DNA



G121
G122
T123
A124
G125
A126
A127
T128
C129
T130
G131
C132
A133
G134
G135
T136
G137
G138
A139
T140
A141
T142
T143
G144
A145
DT

● Molecule 5: 146-MER DNA

Chain J:  11% 88%

DA
T148
C149
A150
A151
T152
A153
T154
C155
C156
A157
C158
C159
T160
G161
G164
A165
T166
T167
C168
C169
A170
C171
C172
A173
A174
A175
T176
G177
T178
G179
T180
A181
T182
T183
G186
A187
A188
A189
C190
T191
G192
C193
T194
C195
C196
A197
T198
C199
A200
A201
A202
A203
G204
G205
C206
A207
T208

G209
T210
T211
C212
A213
G214
C215
T216
G217
A218
A219
T220
T221
C222
A223
G224
C225
T226
G227
A228
A229
C230
A231
T232
G233
C234
C235
T236
T237
T238
T239
G240
A241
T242
G243
G244
A245
G246
C247
A248
G249
T250
T251
T252
C253
C254
A255
A256
A257
T258
A259
C260
A261
C262
T263
T264
T269
A270
G271

A272
A273
T274
C275
T276
G277
C278
A279
G280
G281
T282
G283
G284
A285
T286
A287
T288
T289
G290
A291
T292

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	106.08Å 109.66Å 181.83Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	45.81 – 3.49 45.81 – 3.49	Depositor EDS
% Data completeness (in resolution range)	98.8 (45.81-3.49) 98.8 (45.81-3.49)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.10	Depositor
$\langle I/\sigma(I) \rangle$ ¹	6.31 (at 3.48Å)	Xtrriage
Refinement program	CNS 1.2	Depositor
R, R_{free}	0.190 , 0.266 0.190 , 0.266	Depositor DCC
R_{free} test set	1368 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å ²)	55.7	Xtrriage
Anisotropy	0.359	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.27 , 50.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	0.024 for k,h,-l	Xtrriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	11956	wwPDB-VP
Average B, all atoms (Å ²)	67.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.51% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MN, CL

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.42	0/813	0.64	0/1091
1	E	0.44	0/828	0.69	0/1110
2	B	0.45	0/626	0.70	0/837
2	F	0.44	0/686	0.71	0/918
3	C	0.41	0/829	0.64	0/1118
3	G	0.41	0/815	0.63	0/1100
4	D	0.40	0/756	0.67	0/1015
4	H	0.41	0/730	0.64	0/982
5	I	0.45	0/3332	0.80	0/5141
5	J	0.41	0/3330	0.78	0/5138
All	All	0.42	0/12745	0.73	0/18450

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	801	0	834	62	0
1	E	816	0	851	45	0
2	B	619	0	659	41	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	F	678	0	726	35	0
3	C	819	0	879	66	0
3	G	805	0	861	79	0
4	D	745	0	771	75	0
4	H	719	0	740	65	0
5	I	2970	0	1640	246	0
5	J	2969	0	1641	275	0
6	C	1	0	0	0	0
6	E	1	0	0	1	0
6	G	1	0	0	0	0
7	D	1	0	0	0	0
7	I	6	0	0	0	0
7	J	5	0	0	0	0
All	All	11956	0	9602	855	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 40.

All (855) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:J:149:DC:H2''	5:J:150:DA:H5'	1.22	1.16
5:J:211:DT:H2''	5:J:212:DC:H5'	1.28	1.16
5:J:189:DA:H2''	5:J:190:DC:H5'	1.20	1.14
5:J:199:DC:H2''	5:J:200:DA:H5'	1.25	1.13
5:I:91:DT:H2''	5:I:92:DT:H5'	1.31	1.10
5:J:285:DA:H2''	5:J:286:DT:H5'	1.18	1.10
5:J:182:DT:H2''	5:J:183:DT:H5'	1.30	1.10
5:I:8:DT:H2''	5:I:9:DC:H5''	1.21	1.10
5:J:220:DT:H2''	5:J:221:DT:H5''	1.31	1.10
5:J:252:DT:H2''	5:J:253:DC:H5'	1.23	1.09
5:I:106:DT:H2''	5:I:107:DC:H5'	1.32	1.09
5:J:237:DT:H2''	5:J:238:DT:H5'	1.33	1.09
5:J:259:DA:C2'	5:J:260:DC:H5''	1.81	1.09
5:I:73:DA:H2''	5:I:74:DT:H5'	1.27	1.07
5:J:259:DA:H2''	5:J:260:DC:H5''	1.07	1.06
5:I:65:DT:H2''	5:I:66:DC:H5''	1.34	1.04
5:J:207:DA:H2''	5:J:208:DT:H5'	1.39	1.03
5:I:8:DT:C2'	5:I:9:DC:H5''	1.87	1.03
5:J:224:DG:H2''	5:J:225:DC:H5'	1.42	1.02
5:I:95:DA:H2''	5:I:96:DT:H5''	1.41	1.02

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:33:ARG:HH11	4:D:33:ARG:HB2	1.20	1.01
5:J:168:DC:H2''	5:J:169:DT:H5'	1.42	1.01
5:I:17:DA:H2''	5:I:18:DG:H5''	1.41	1.00
5:J:152:DT:H2''	5:J:153:DA:H5''	1.44	0.99
5:J:234:DC:H2''	5:J:235:DC:H5'	1.45	0.99
1:A:121:PRO:O	1:A:125:GLN:HG3	1.65	0.97
1:A:63:ARG:H	1:A:63:ARG:HH11	1.13	0.95
5:I:65:DT:C2'	5:I:66:DC:H5''	1.96	0.94
4:D:86:ARG:NH1	4:D:86:ARG:HB2	1.81	0.94
1:A:134:ARG:NH1	1:A:134:ARG:HB3	1.81	0.94
5:J:167:DT:H2''	5:J:168:DC:H5''	1.44	0.94
5:J:173:DA:H2''	5:J:174:DA:C8	2.03	0.94
5:J:151:DA:H2''	5:J:152:DT:H5'	1.50	0.93
5:I:23:DT:H2''	5:I:24:DA:H5'	1.46	0.93
5:I:100:DG:H4'	5:I:100:DG:OP1	1.68	0.92
5:I:95:DA:C2'	5:I:96:DT:H5''	1.98	0.92
5:I:9:DC:H2''	5:I:10:DC:H5'	1.48	0.92
5:J:259:DA:H2''	5:J:260:DC:C5'	1.98	0.92
3:C:42:ARG:HB2	4:D:88:THR:HB	1.49	0.92
3:G:102:ILE:HG23	4:H:61:ILE:HD13	1.50	0.92
5:I:106:DT:H2''	5:I:107:DC:C5'	2.00	0.91
5:J:179:DG:H2''	5:J:180:DT:H5'	1.51	0.91
5:J:221:DT:H2''	5:J:222:DC:H5'	1.52	0.91
1:E:42:ARG:HG2	1:E:42:ARG:HH11	1.33	0.90
5:J:231:DA:H2''	5:J:232:DT:H5'	1.51	0.90
5:J:270:DA:C2'	5:J:271:DG:H5''	2.01	0.90
3:G:83:LEU:O	3:G:87:ILE:HG12	1.70	0.90
5:I:136:DT:C2'	5:I:137:DG:H5''	2.02	0.89
5:J:152:DT:H2''	5:J:153:DA:C5'	2.03	0.89
5:J:220:DT:H2''	5:J:221:DT:C5'	2.02	0.89
5:J:207:DA:H2'	5:J:208:DT:H71	1.55	0.89
5:J:263:DT:H4'	5:J:264:DT:OP1	1.71	0.88
4:D:86:ARG:HH11	4:D:86:ARG:HB2	1.34	0.88
3:C:50:TYR:OH	4:D:95:GLN:HG3	1.74	0.88
5:I:41:DA:H2''	5:I:42:DA:H5''	1.56	0.88
5:J:252:DT:H2''	5:J:253:DC:C5'	2.04	0.87
5:I:73:DA:H2''	5:I:74:DT:C5'	2.03	0.86
5:I:80:DT:H2''	5:I:81:DG:C8	2.11	0.86
5:J:270:DA:H2''	5:J:271:DG:H5''	1.55	0.86
5:J:248:DA:H2''	5:J:249:DG:H5'	1.56	0.86
5:I:117:DT:H2'	5:I:118:DT:H72	1.56	0.86

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:J:177:DG:H2''	5:J:178:DT:H5'	1.58	0.86
5:J:275:DC:H2'	5:J:276:DT:C7	2.06	0.86
5:I:26:DC:H2''	5:I:27:DA:C8	2.11	0.85
5:J:170:DA:H1'	5:J:171:DC:H5''	1.58	0.85
4:D:33:ARG:HH11	4:D:33:ARG:CB	1.89	0.85
5:J:285:DA:H2''	5:J:286:DT:C5'	2.05	0.85
1:A:134:ARG:HH11	1:A:134:ARG:HB3	1.39	0.85
3:C:62:ILE:HD13	3:C:93:LEU:HD13	1.59	0.84
5:J:152:DT:C2'	5:J:153:DA:H5''	2.08	0.84
5:I:131:DG:H2''	5:I:132:DC:C5	2.13	0.84
5:J:211:DT:C2'	5:J:212:DC:H5'	2.08	0.84
5:I:136:DT:H2''	5:I:137:DG:O4'	1.78	0.84
5:J:168:DC:H2''	5:J:169:DT:C5'	2.07	0.84
2:B:60:VAL:HG12	2:B:64:ASN:HD21	1.43	0.84
5:J:249:DG:H2''	5:J:250:DT:H5''	1.60	0.83
5:I:5:DA:H2''	5:I:6:DT:O5'	1.79	0.83
5:I:78:DG:H2''	5:I:79:DC:C5	2.13	0.83
2:F:75:HIS:HD2	4:H:96:THR:OG1	1.61	0.83
5:J:219:DA:H2''	5:J:220:DT:O5'	1.78	0.82
5:I:136:DT:H2''	5:I:137:DG:H5''	1.60	0.82
5:I:129:DC:H2''	5:I:130:DT:C5	2.13	0.82
5:I:33:DG:H2''	5:I:34:DT:H5'	1.59	0.82
5:J:206:DC:H2''	5:J:207:DA:C8	2.14	0.81
5:I:49:DC:H2''	5:I:50:DC:H5'	1.62	0.81
5:J:165:DA:OP1	5:J:165:DA:H4'	1.81	0.81
5:J:241:DA:H2''	5:J:242:DT:H5''	1.62	0.81
5:J:191:DT:H2''	5:J:192:DG:C8	2.16	0.81
1:E:108:ASN:O	1:E:112:ILE:HG13	1.81	0.80
5:J:199:DC:H2''	5:J:200:DA:C5'	2.10	0.80
5:J:189:DA:H2''	5:J:190:DC:C5'	2.08	0.80
4:D:88:THR:HG23	5:I:39:DG:OP1	1.82	0.80
4:H:107:ALA:O	4:H:111:VAL:HG23	1.82	0.80
5:I:56:DA:H1'	5:I:57:DA:H5'	1.64	0.80
3:C:102:ILE:HG23	4:D:61:ILE:HD13	1.64	0.80
5:J:270:DA:C3'	5:J:271:DG:H5''	2.12	0.80
5:J:158:DC:H2''	5:J:159:DC:O5'	1.83	0.79
5:J:204:DG:H2''	5:J:205:DG:C8	2.18	0.79
5:J:149:DC:H2''	5:J:150:DA:C5'	2.10	0.79
3:G:39:TYR:O	4:H:78:SER:HB2	1.83	0.78
3:G:92:GLU:OE2	4:H:105:GLU:HB3	1.83	0.78
4:D:99:ARG:HH12	4:D:108:LYS:HE2	1.48	0.78

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:J:149:DC:C2'	5:J:150:DA:H5'	2.11	0.78
5:J:240:DG:H2''	5:J:241:DA:OP2	1.82	0.78
1:E:42:ARG:HG2	1:E:42:ARG:NH1	1.98	0.77
5:I:68:DG:OP1	5:I:68:DG:H4'	1.85	0.77
5:J:241:DA:C2'	5:J:242:DT:H5''	2.15	0.77
3:G:32:ARG:HH11	3:G:36:LYS:NZ	1.82	0.77
5:J:197:DA:H1'	5:J:198:DT:H5''	1.66	0.77
5:I:137:DG:H2''	5:I:138:DG:H8	1.51	0.76
5:I:8:DT:H2''	5:I:9:DC:C5'	2.10	0.76
5:I:72:DA:H2''	5:I:73:DA:O5'	1.85	0.76
5:J:241:DA:H1'	5:J:242:DT:H5''	1.67	0.76
5:J:277:DG:H1'	5:J:278:DC:H5'	1.66	0.76
5:J:220:DT:C2'	5:J:221:DT:H5''	2.12	0.76
3:C:49:VAL:HG11	4:D:118:VAL:HA	1.66	0.75
5:J:174:DA:H2''	5:J:175:DA:H5''	1.67	0.75
5:J:238:DT:H1'	5:J:239:DT:H5''	1.69	0.75
5:J:247:DC:H4'	5:J:247:DC:OP1	1.85	0.75
5:I:43:DA:H2''	5:I:44:DC:O5'	1.86	0.75
5:J:177:DG:H2''	5:J:178:DT:C5'	2.16	0.75
3:C:31:HIS:CD2	3:C:48:PRO:HG2	2.22	0.75
5:I:93:DT:H1'	5:I:94:DG:H5''	1.69	0.74
5:J:237:DT:H2''	5:J:238:DT:C5'	2.14	0.74
2:F:75:HIS:CE1	4:H:80:LEU:HD21	2.22	0.74
5:I:137:DG:H2''	5:I:138:DG:C8	2.22	0.74
5:I:128:DT:H2''	5:I:129:DC:O5'	1.88	0.74
5:J:167:DT:H2''	5:J:168:DC:C5'	2.18	0.74
5:I:91:DT:C2'	5:I:92:DT:H5'	2.15	0.74
3:G:29:ARG:HD2	3:G:32:ARG:NH2	2.02	0.74
1:A:65:LEU:HD23	5:J:237:DT:H5''	1.69	0.73
4:D:33:ARG:NH1	5:J:269:DT:H4'	2.03	0.73
3:G:50:TYR:OH	4:H:95:GLN:HG3	1.87	0.73
5:I:93:DT:H2''	5:I:94:DG:H5'	1.71	0.73
3:C:15:LYS:HB2	3:C:20:ARG:HH22	1.54	0.73
5:I:117:DT:H2'	5:I:118:DT:C7	2.18	0.73
5:I:130:DT:H2''	5:I:131:DG:H5''	1.69	0.73
5:I:65:DT:C3'	5:I:66:DC:H5''	2.19	0.73
5:J:285:DA:C2'	5:J:286:DT:H5'	2.10	0.73
5:I:93:DT:H1'	5:I:94:DG:C5'	2.18	0.73
5:J:151:DA:H2''	5:J:152:DT:C5'	2.17	0.73
5:J:201:DA:H4'	5:J:201:DA:OP1	1.89	0.73
1:A:65:LEU:HB3	1:A:66:PRO:HD3	1.72	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:G:81:ARG:HD3	3:G:85:LEU:HD11	1.71	0.72
5:I:107:DC:H2''	5:I:108:DC:OP2	1.89	0.72
5:J:284:DG:H2''	5:J:285:DA:C8	2.24	0.72
5:I:41:DA:C2'	5:I:42:DA:H5''	2.18	0.72
5:I:8:DT:C3'	5:I:9:DC:H5''	2.17	0.72
2:B:60:VAL:HG12	2:B:64:ASN:ND2	2.05	0.72
2:B:75:HIS:HD2	4:D:96:THR:OG1	1.72	0.72
3:C:103:ALA:O	3:C:104:GLN:HB2	1.88	0.72
5:I:77:DA:H2''	5:I:78:DG:O5'	1.90	0.72
5:J:204:DG:OP1	5:J:204:DG:H4'	1.90	0.71
1:A:63:ARG:H	1:A:63:ARG:NH1	1.87	0.71
5:J:240:DG:H1'	5:J:241:DA:H5'	1.72	0.71
1:E:134:ARG:HD3	1:E:134:ARG:O	1.90	0.71
2:F:62:LEU:HD22	2:F:66:ILE:HD11	1.71	0.71
5:I:37:DT:H2''	5:I:38:DT:C6	2.26	0.71
5:J:202:DA:H4'	5:J:202:DA:OP1	1.91	0.71
1:A:134:ARG:HH11	1:A:134:ARG:CB	2.03	0.71
2:B:31:LYS:HB3	2:B:32:PRO:HD3	1.71	0.71
5:I:130:DT:C2'	5:I:131:DG:H5''	2.21	0.71
5:J:256:DA:H1'	5:J:257:DA:H5''	1.73	0.71
5:I:17:DA:C2'	5:I:18:DG:H5''	2.19	0.71
5:J:249:DG:C2'	5:J:250:DT:H5''	2.19	0.71
3:G:65:LEU:HA	3:G:68:ASN:HD22	1.54	0.70
5:I:139:DA:H2'	5:I:140:DT:H72	1.73	0.70
5:J:167:DT:C2'	5:J:168:DC:H5''	2.20	0.70
5:J:191:DT:H2''	5:J:192:DG:H8	1.56	0.70
5:I:103:DG:H4'	5:I:103:DG:OP1	1.91	0.70
5:I:100:DG:H2''	5:I:101:DC:C6	2.26	0.70
4:D:39:ILE:HD11	5:J:269:DT:H72	1.73	0.70
5:J:248:DA:H2''	5:J:249:DG:C5'	2.21	0.69
4:D:39:ILE:HD11	5:J:269:DT:C7	2.22	0.69
5:I:52:DT:H2''	5:I:53:DC:O5'	1.92	0.69
1:A:61:LEU:HD12	2:B:37:LEU:HD23	1.74	0.69
1:A:117:VAL:HG22	3:G:115:LEU:HD23	1.73	0.69
5:I:23:DT:H2''	5:I:24:DA:C5'	2.22	0.69
4:H:46:LYS:HA	4:H:46:LYS:HE2	1.75	0.69
5:J:182:DT:H2''	5:J:183:DT:C5'	2.18	0.69
5:J:238:DT:H2''	5:J:239:DT:H5'	1.75	0.69
3:C:31:HIS:HD2	3:C:48:PRO:HG2	1.56	0.68
5:I:125:DG:H2''	5:I:126:DA:O5'	1.93	0.68
5:J:189:DA:C2'	5:J:190:DC:H5'	2.11	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:63:ARG:HB2	1:E:63:ARG:CZ	2.23	0.68
5:I:74:DT:H2''	5:I:75:DT:O5'	1.93	0.68
5:I:38:DT:H2'	5:I:39:DG:C8	2.28	0.68
5:I:113:DA:H1'	5:I:114:DC:H5''	1.75	0.68
3:C:47:ALA:HB3	3:C:48:PRO:HD3	1.75	0.68
5:I:1:DA:H2''	5:I:2:DT:OP2	1.93	0.68
5:I:96:DT:H2''	5:I:97:DG:C8	2.29	0.68
5:J:259:DA:C3'	5:J:260:DC:H5''	2.23	0.68
5:J:206:DC:H2''	5:J:207:DA:H8	1.58	0.67
5:I:122:DG:H2'	5:I:123:DT:H71	1.77	0.67
5:I:35:DA:H2''	5:I:36:DT:OP2	1.94	0.67
5:J:172:DC:H2''	5:J:173:DA:C8	2.29	0.67
5:I:75:DT:H2''	5:I:76:DC:H5'	1.75	0.67
5:J:257:DA:H2''	5:J:258:DT:H5'	1.76	0.67
1:A:100:LEU:HD11	2:B:58:LEU:HD13	1.77	0.67
3:G:84:GLN:HG2	3:G:105:GLY:O	1.95	0.67
5:I:65:DT:H2''	5:I:66:DC:C5'	2.20	0.67
5:J:279:DA:H2'	5:J:280:DG:C8	2.30	0.67
2:F:66:ILE:O	2:F:70:VAL:HG23	1.95	0.67
5:I:86:DT:H2''	5:I:87:DG:H5''	1.75	0.66
3:C:20:ARG:HB2	3:C:20:ARG:NH1	2.10	0.66
3:C:102:ILE:HG23	4:D:61:ILE:CD1	2.25	0.66
5:I:137:DG:H4'	5:I:137:DG:OP1	1.94	0.66
1:A:76:GLN:OE1	1:A:80:THR:HA	1.96	0.66
3:G:62:ILE:HD13	3:G:93:LEU:HD13	1.76	0.66
4:H:48:VAL:HG23	4:H:49:HIS:ND1	2.10	0.66
5:J:154:DT:H2''	5:J:155:DC:O5'	1.96	0.66
4:D:98:VAL:HG13	4:D:102:LEU:HD22	1.77	0.66
3:C:15:LYS:HB3	3:C:20:ARG:HH12	1.59	0.65
3:G:102:ILE:CG2	4:H:61:ILE:HD13	2.25	0.65
5:J:275:DC:H2'	5:J:276:DT:H72	1.77	0.65
5:J:224:DG:C2'	5:J:225:DC:H5'	2.21	0.65
3:C:92:GLU:HB3	4:D:106:LEU:HD13	1.78	0.65
2:F:30:THR:HB	2:F:32:PRO:HD2	1.78	0.65
2:F:39:ARG:O	2:F:42:GLY:N	2.25	0.65
5:I:2:DT:H1'	5:I:3:DC:H5'	1.78	0.65
5:J:199:DC:C2'	5:J:200:DA:H5'	2.15	0.65
5:J:176:DA:H2''	5:J:177:DG:OP2	1.95	0.65
5:J:182:DT:C2'	5:J:183:DT:H5'	2.20	0.65
5:J:241:DA:C1'	5:J:242:DT:H5''	2.26	0.65
1:E:37:LYS:HB2	1:E:38:PRO:C	2.17	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:I:36:DT:H2''	5:I:37:DT:O5'	1.96	0.65
5:J:194:DT:H2''	5:J:195:DC:C6	2.32	0.65
1:E:63:ARG:HB2	1:E:63:ARG:NH1	2.11	0.65
5:I:116:DC:H2''	5:I:117:DT:O5'	1.97	0.65
5:I:26:DC:H2''	5:I:27:DA:N7	2.12	0.64
5:I:6:DT:H2''	5:I:7:DA:C8	2.32	0.64
2:F:56:GLY:O	2:F:60:VAL:HG23	1.98	0.64
5:J:235:DC:H2''	5:J:236:DT:C7	2.27	0.64
3:C:76:THR:HG23	5:J:277:DG:H3'	1.79	0.64
3:G:29:ARG:HD2	3:G:32:ARG:HH21	1.61	0.64
5:J:247:DC:H2''	5:J:248:DA:C8	2.33	0.64
5:J:270:DA:H2''	5:J:271:DG:O4'	1.97	0.64
5:J:275:DC:H2'	5:J:276:DT:H73	1.80	0.64
1:A:131:ARG:HD3	1:A:133:GLU:OE2	1.98	0.64
5:I:38:DT:H4'	5:I:38:DT:OP1	1.98	0.64
5:J:249:DG:H2''	5:J:250:DT:C5'	2.29	0.63
4:D:79:ARG:HB3	4:D:79:ARG:HH11	1.64	0.63
3:C:30:VAL:HG13	3:C:51:LEU:HD23	1.79	0.63
2:B:45:ARG:NE	5:I:69:DC:H4'	2.14	0.63
5:I:75:DT:H2''	5:I:76:DC:C5'	2.29	0.63
5:I:19:DA:H1'	5:I:20:DT:H5'	1.81	0.63
2:B:52:GLU:OE2	2:B:52:GLU:HA	1.99	0.62
5:I:136:DT:C3'	5:I:137:DG:H5''	2.29	0.62
2:F:35:ARG:O	2:F:39:ARG:HG2	1.99	0.62
5:J:240:DG:H1'	5:J:241:DA:C5'	2.29	0.62
5:J:243:DG:OP1	5:J:243:DG:H4'	1.99	0.62
5:J:252:DT:C2'	5:J:253:DC:H5'	2.15	0.62
5:I:23:DT:H4'	5:I:23:DT:OP1	1.98	0.62
2:B:73:THR:HA	2:B:78:ARG:HH12	1.63	0.62
1:A:134:ARG:HD2	1:A:134:ARG:O	1.99	0.62
3:G:112:GLN:HB2	3:G:115:LEU:HD12	1.82	0.62
5:J:173:DA:H2''	5:J:174:DA:N7	2.14	0.62
5:I:102:DA:OP1	5:I:102:DA:H4'	2.00	0.62
5:I:15:DG:N2	5:J:279:DA:C2	2.67	0.62
4:D:107:ALA:O	4:D:111:VAL:HG23	2.00	0.62
4:H:92:ARG:HH11	4:H:92:ARG:HG2	1.64	0.62
1:A:65:LEU:HD23	5:J:237:DT:C5'	2.29	0.62
3:G:73:ASN:O	3:G:74:LYS:HB2	1.99	0.62
5:I:142:DT:H1'	5:I:143:DT:H5''	1.81	0.62
3:C:50:TYR:O	3:C:54:VAL:HG23	2.00	0.61
5:I:17:DA:H2''	5:I:18:DG:C5'	2.26	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:49:ARG:HD2	5:J:155:DC:P	2.40	0.61
5:I:60:DC:H2''	5:I:61:DA:C8	2.36	0.61
5:J:195:DC:H1'	5:J:196:DC:C5	2.35	0.61
5:J:197:DA:H1'	5:J:198:DT:C5'	2.30	0.61
2:B:35:ARG:HH11	2:B:35:ARG:HB2	1.64	0.61
5:I:115:DA:H2''	5:I:116:DC:O5'	1.99	0.61
5:I:136:DT:H2''	5:I:137:DG:C5'	2.30	0.61
5:J:251:DT:H4'	5:J:251:DT:OP1	2.01	0.61
4:D:55:SER:OG	4:D:56:SER:N	2.34	0.61
5:J:246:DG:H2''	5:J:247:DC:O4'	2.01	0.61
4:D:30:LYS:NZ	5:J:193:DC:OP1	2.30	0.60
1:E:73:GLU:OE2	2:F:25:ASN:HB2	2.00	0.60
1:E:63:ARG:HH22	2:F:30:THR:HG23	1.66	0.60
4:H:88:THR:HG23	5:J:186:DG:OP1	2.00	0.60
5:I:135:DG:H2''	5:I:136:DT:O4'	2.01	0.60
5:I:141:DA:N6	5:J:151:DA:N6	2.49	0.60
2:F:52:GLU:OE2	2:F:55:ARG:NH1	2.34	0.60
4:D:99:ARG:NH1	4:D:108:LYS:HE2	2.15	0.60
5:I:89:DC:H2''	5:I:90:DT:H71	1.83	0.60
4:D:46:LYS:HE2	4:D:46:LYS:HA	1.82	0.60
3:G:32:ARG:NH1	3:G:36:LYS:NZ	2.50	0.60
1:E:131:ARG:HD3	1:E:133:GLU:OE2	2.01	0.60
5:J:263:DT:C4'	5:J:264:DT:OP1	2.45	0.60
5:I:106:DT:C2'	5:I:107:DC:H5'	2.21	0.60
5:I:90:DT:H2''	5:I:91:DT:O5'	2.01	0.60
5:J:246:DG:H2'	5:J:247:DC:C6	2.37	0.60
1:E:70:LEU:O	1:E:74:ILE:HG13	2.01	0.60
5:I:66:DC:H2''	5:I:67:DA:C8	2.36	0.60
5:J:172:DC:H2''	5:J:173:DA:H8	1.66	0.60
5:J:232:DT:H1'	5:J:233:DG:H5''	1.84	0.59
5:J:279:DA:H2''	5:J:280:DG:H5'	1.83	0.59
5:J:225:DC:H2''	5:J:226:DT:OP2	2.02	0.59
5:J:235:DC:H2''	5:J:236:DT:H71	1.82	0.59
5:J:215:DC:H2''	5:J:216:DT:H71	1.85	0.59
5:I:130:DT:H2''	5:I:131:DG:C5'	2.31	0.59
5:J:203:DA:H2''	5:J:204:DG:C8	2.38	0.59
2:B:83:ALA:O	2:B:87:VAL:HG23	2.01	0.59
5:J:282:DT:H2''	5:J:283:DG:O5'	2.03	0.59
5:I:143:DT:H2''	5:I:144:DG:H8	1.66	0.59
5:I:95:DA:C3'	5:I:96:DT:H5''	2.32	0.59
3:G:49:VAL:HG13	4:H:118:VAL:HG22	1.84	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:I:56:DA:OP1	5:I:56:DA:H4'	2.02	0.59
5:I:99:DA:H2''	5:I:100:DG:O5'	2.02	0.59
5:J:150:DA:C2	5:J:151:DA:N6	2.71	0.59
3:C:15:LYS:HB3	3:C:20:ARG:NH1	2.18	0.58
1:E:49:ARG:HD2	5:I:8:DT:OP2	2.03	0.58
5:J:157:DA:H2''	5:J:158:DC:C6	2.38	0.58
5:J:238:DT:H2''	5:J:239:DT:C5'	2.32	0.58
5:J:270:DA:H2''	5:J:271:DG:C5'	2.32	0.58
4:D:86:ARG:HH11	4:D:86:ARG:CB	2.11	0.58
5:I:68:DG:H2''	5:I:69:DC:C6	2.38	0.58
2:F:31:LYS:HB3	2:F:32:PRO:HD3	1.85	0.58
3:C:20:ARG:HB2	3:C:20:ARG:HH11	1.68	0.58
4:D:37:TYR:H	4:D:63:ASN:HD21	1.52	0.58
3:G:81:ARG:NH2	3:G:107:VAL:O	2.36	0.58
1:A:83:ARG:HD2	5:J:247:DC:OP1	2.04	0.58
1:A:88:ALA:HA	2:B:83:ALA:HA	1.85	0.58
5:I:48:DT:H2''	5:I:49:DC:C6	2.38	0.58
5:J:181:DA:H2''	5:J:182:DT:O5'	2.04	0.58
1:A:97:GLU:O	1:A:101:VAL:HG23	2.03	0.58
5:I:143:DT:H2''	5:I:144:DG:C8	2.37	0.58
3:C:81:ARG:HD3	3:C:81:ARG:O	2.04	0.57
3:G:17:ARG:HB3	4:H:121:TYR:HE1	1.69	0.57
5:I:47:DC:H2''	5:I:48:DT:O5'	2.03	0.57
5:I:59:DG:OP1	5:I:59:DG:H4'	2.03	0.57
2:B:78:ARG:HB2	2:B:78:ARG:HH11	1.70	0.57
4:H:62:MET:O	4:H:66:VAL:HG23	2.03	0.57
4:D:33:ARG:NH1	4:D:33:ARG:HB2	2.05	0.57
3:G:49:VAL:CG1	4:H:118:VAL:HG22	2.34	0.57
4:H:37:TYR:H	4:H:63:ASN:ND2	2.03	0.57
5:J:279:DA:H2''	5:J:280:DG:C5'	2.35	0.57
3:C:32:ARG:NH2	4:D:35:GLU:OE1	2.37	0.57
3:C:87:ILE:HD13	3:C:97:LEU:HD13	1.85	0.57
1:A:117:VAL:HG22	3:G:115:LEU:CD2	2.35	0.57
5:I:63:DG:H2''	5:I:64:DT:O5'	2.04	0.57
5:I:53:DC:H2''	5:I:54:DA:O5'	2.05	0.57
5:J:204:DG:H2''	5:J:205:DG:N7	2.19	0.57
5:I:102:DA:H2''	5:I:103:DG:C8	2.40	0.56
5:I:111:DA:H8	5:I:111:DA:H5'	1.68	0.56
3:C:81:ARG:HD3	3:C:81:ARG:C	2.25	0.56
5:I:47:DC:N4	5:J:245:DA:N6	2.53	0.56
5:I:73:DA:C2'	5:I:74:DT:H5'	2.19	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:J:150:DA:C2	5:J:151:DA:C6	2.93	0.56
2:B:44:LYS:HB2	3:G:115:LEU:HD22	1.87	0.56
3:G:32:ARG:HD2	3:G:36:LYS:HE3	1.85	0.56
1:A:63:ARG:O	1:A:66:PRO:HD2	2.05	0.56
5:I:94:DG:H2''	5:I:95:DA:O5'	2.05	0.56
5:J:190:DC:H2''	5:J:191:DT:O5'	2.06	0.56
5:I:119:DT:H2''	5:I:120:DT:OP2	2.05	0.56
5:I:93:DT:C2'	5:I:94:DG:H5'	2.35	0.56
2:F:31:LYS:HG3	2:F:51:TYR:CE1	2.40	0.56
4:H:84:ASN:O	4:H:86:ARG:HG3	2.04	0.56
4:D:32:SER:HB3	5:I:103:DG:OP1	2.06	0.56
5:J:193:DC:H2''	5:J:194:DT:H71	1.88	0.56
5:J:222:DC:H2''	5:J:223:DA:C8	2.40	0.56
5:I:120:DT:H2''	5:I:121:DG:C8	2.41	0.56
5:J:279:DA:OP1	5:J:279:DA:H4'	2.06	0.56
2:F:22:LEU:O	2:F:23:ARG:HG3	2.06	0.56
5:I:41:DA:C3'	5:I:42:DA:H5''	2.36	0.56
5:J:174:DA:H2''	5:J:175:DA:C8	2.40	0.56
1:A:134:ARG:C	1:A:134:ARG:HD2	2.25	0.55
5:I:117:DT:H4'	5:I:117:DT:OP1	2.05	0.55
5:I:33:DG:H2''	5:I:34:DT:C5'	2.32	0.55
3:C:50:TYR:HH	4:D:95:GLN:HG3	1.72	0.55
3:G:29:ARG:CD	3:G:32:ARG:HH21	2.19	0.55
5:I:139:DA:H2'	5:I:140:DT:C7	2.37	0.55
1:A:70:LEU:HD11	1:A:74:ILE:HD11	1.89	0.55
5:J:218:DA:H1'	5:J:219:DA:H5'	1.88	0.55
3:C:118:LYS:C	3:C:118:LYS:HD2	2.26	0.55
5:I:79:DC:H2''	5:I:80:DT:H71	1.88	0.55
5:J:281:DG:H2''	5:J:282:DT:H5'	1.89	0.55
3:G:56:GLU:O	3:G:59:THR:HB	2.06	0.55
5:I:77:DA:H2''	5:I:78:DG:C5'	2.37	0.55
5:I:57:DA:H2''	5:I:58:DG:C8	2.42	0.55
5:J:211:DT:H6	5:J:211:DT:H5'	1.72	0.55
2:B:44:LYS:CB	3:G:115:LEU:HD22	2.36	0.55
1:A:51:ILE:HG21	3:G:111:ILE:HG12	1.89	0.55
5:J:255:DA:H2''	5:J:256:DA:C8	2.42	0.55
1:A:119:ILE:HD13	2:B:43:VAL:HG21	1.90	0.54
3:C:54:VAL:HG13	4:D:110:ALA:HB1	1.89	0.54
5:I:67:DA:C2	5:J:227:DG:N2	2.74	0.54
5:J:153:DA:H1'	5:J:154:DT:H5'	1.90	0.54
1:A:96:CYS:SG	2:B:58:LEU:CD1	2.96	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:20:ARG:CB	3:C:20:ARG:HH11	2.21	0.54
5:J:174:DA:C2'	5:J:175:DA:H5''	2.36	0.54
5:I:129:DC:H2''	5:I:130:DT:C6	2.41	0.54
5:I:37:DT:H4'	5:I:37:DT:OP1	2.07	0.54
4:H:119:THR:HA	4:H:122:THR:CG2	2.37	0.54
5:J:284:DG:H2''	5:J:285:DA:H8	1.73	0.54
1:A:46:VAL:HG12	1:A:50:GLU:OE2	2.07	0.54
5:I:28:DA:H2''	5:I:29:DA:C8	2.43	0.54
4:D:68:ASP:O	4:D:72:ARG:HG3	2.08	0.54
4:H:42:TYR:CZ	4:H:46:LYS:HD2	2.43	0.54
5:J:246:DG:C2'	5:J:247:DC:C6	2.91	0.54
3:G:46:GLY:O	3:G:49:VAL:HG12	2.08	0.53
5:I:65:DT:OP1	5:I:65:DT:H4'	2.08	0.53
5:I:86:DT:C2'	5:I:87:DG:H5''	2.37	0.53
3:C:81:ARG:NH2	3:C:107:VAL:O	2.41	0.53
1:A:114:ALA:HB2	1:E:113:HIS:CE1	2.43	0.53
3:G:15:LYS:HD2	5:J:178:DT:OP1	2.08	0.53
3:G:32:ARG:HH11	3:G:36:LYS:HZ2	1.54	0.53
5:J:170:DA:C1'	5:J:171:DC:H5''	2.33	0.53
5:J:178:DT:H2''	5:J:179:DG:C8	2.43	0.53
5:J:202:DA:H2''	5:J:203:DA:C8	2.43	0.53
5:J:148:DT:H2''	5:J:149:DC:C6	2.43	0.53
3:G:78:ILE:HG13	4:H:52:THR:HG21	1.89	0.53
5:I:131:DG:H2''	5:I:132:DC:C6	2.43	0.53
5:I:93:DT:H1'	5:I:94:DG:H5'	1.91	0.53
5:J:182:DT:H2'	5:J:183:DT:H72	1.91	0.53
5:J:258:DT:H2''	5:J:259:DA:OP2	2.08	0.53
5:I:84:DC:H2''	5:I:85:DA:C8	2.44	0.53
5:J:152:DT:H2''	5:J:153:DA:H5'	1.88	0.53
5:J:248:DA:H1'	5:J:249:DG:H5''	1.89	0.53
1:A:116:ARG:NH1	1:A:120:MET:HG3	2.24	0.53
5:I:46:DG:N2	5:J:248:DA:C2	2.77	0.53
5:J:274:DT:H2''	5:J:275:DC:O5'	2.09	0.53
1:A:76:GLN:HA	1:A:76:GLN:OE1	2.09	0.53
1:E:60:LEU:HD12	1:E:64:LYS:NZ	2.24	0.53
4:H:56:SER:HB2	5:J:166:DT:OP2	2.09	0.53
5:I:144:DG:N1	5:J:150:DA:N7	2.56	0.53
1:E:37:LYS:N	1:E:38:PRO:HA	2.24	0.52
3:G:32:ARG:NH1	3:G:36:LYS:HZ2	2.07	0.52
5:I:115:DA:H4'	5:I:115:DA:OP1	2.08	0.52
2:F:78:ARG:HB2	2:F:78:ARG:NH1	2.23	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:J:207:DA:C2'	5:J:208:DT:H5'	2.26	0.52
1:E:122:GLN:HG2	6:E:1001:CL:CL	2.47	0.52
3:G:84:GLN:NE2	3:G:102:ILE:HD13	2.24	0.52
4:H:80:LEU:C	4:H:80:LEU:HD23	2.30	0.52
5:I:103:DG:H2''	5:I:104:DT:H5''	1.91	0.52
4:H:92:ARG:NH1	4:H:92:ARG:HG2	2.23	0.52
5:I:111:DA:C8	5:I:111:DA:H5'	2.43	0.52
5:J:227:DG:H2''	5:J:228:DA:C8	2.44	0.52
1:A:64:LYS:NZ	1:A:90:MET:SD	2.83	0.52
5:I:58:DG:H4'	5:I:58:DG:OP1	2.09	0.52
5:J:165:DA:H2'	5:J:166:DT:H71	1.91	0.52
5:J:272:DA:H2''	5:J:273:DA:OP2	2.08	0.52
1:A:134:ARG:C	1:A:134:ARG:HH11	2.13	0.52
5:I:89:DC:H1'	5:I:90:DT:C6	2.45	0.52
5:I:96:DT:H4'	5:I:96:DT:OP1	2.10	0.52
5:I:89:DC:H2''	5:I:90:DT:C7	2.40	0.52
3:C:95:LYS:HD3	3:C:95:LYS:C	2.30	0.51
4:D:51:ASP:OD2	4:D:52:THR:HG23	2.10	0.51
3:C:77:ARG:HA	4:D:53:GLY:O	2.09	0.51
5:I:21:DT:H2''	5:I:22:DC:O5'	2.10	0.51
5:I:34:DT:H2''	5:I:35:DA:H8	1.74	0.51
5:J:250:DT:H2''	5:J:251:DT:O5'	2.10	0.51
1:A:40:ARG:NH2	5:J:229:DA:N3	2.58	0.51
3:C:30:VAL:HG21	3:C:52:ALA:HB2	1.91	0.51
5:I:9:DC:C2'	5:I:10:DC:H5'	2.31	0.51
5:J:275:DC:H2''	5:J:276:DT:C6	2.46	0.51
5:J:263:DT:H2''	5:J:264:DT:C7	2.39	0.51
3:C:77:ARG:HG2	4:D:53:GLY:O	2.11	0.51
3:G:78:ILE:HG13	4:H:52:THR:CG2	2.41	0.51
3:G:32:ARG:NH2	4:H:35:GLU:OE1	2.44	0.51
4:H:69:ILE:O	4:H:73:ILE:HG12	2.11	0.51
5:I:14:DT:H2''	5:I:15:DG:C8	2.45	0.51
5:I:6:DT:H2''	5:I:7:DA:H8	1.75	0.51
5:J:173:DA:C2	5:J:174:DA:C2	2.99	0.51
1:A:63:ARG:HB2	1:A:63:ARG:NH1	2.26	0.51
5:I:135:DG:N2	5:J:159:DC:C2	2.79	0.51
4:H:119:THR:HA	4:H:122:THR:HG22	1.93	0.51
5:I:1:DA:HO5'	5:I:1:DA:H8	1.59	0.51
5:J:149:DC:C2	5:J:150:DA:N7	2.79	0.51
4:D:108:LYS:HE3	4:D:108:LYS:N	2.26	0.50
4:H:70:PHE:CD1	4:H:70:PHE:C	2.84	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:J:155:DC:H2''	5:J:156:DC:O5'	2.11	0.50
1:E:46:VAL:HB	5:I:82:DA:OP1	2.11	0.50
2:F:26:ILE:O	2:F:26:ILE:HG13	2.10	0.50
5:J:179:DG:C8	5:J:180:DT:H72	2.46	0.50
4:D:99:ARG:HH22	4:D:108:LYS:HE2	1.76	0.50
5:J:221:DT:C2'	5:J:222:DC:H5'	2.35	0.50
1:A:119:ILE:HG13	2:B:50:ILE:HD12	1.93	0.50
3:G:49:VAL:HG13	3:G:50:TYR:N	2.26	0.50
4:H:37:TYR:H	4:H:63:ASN:HD21	1.57	0.50
5:I:132:DC:C4	5:I:133:DA:N6	2.79	0.50
2:F:78:ARG:CB	2:F:78:ARG:HH11	2.25	0.50
5:I:97:DG:N2	5:J:197:DA:C2	2.79	0.50
3:G:39:TYR:HB3	4:H:78:SER:HB3	1.93	0.50
5:I:77:DA:H2'	5:I:78:DG:C8	2.46	0.50
5:J:286:DT:H1'	5:J:287:DA:C5'	2.42	0.50
3:C:26:PRO:HD3	4:D:40:TYR:CD2	2.47	0.50
2:F:71:THR:HG21	4:H:100:LEU:HD21	1.93	0.50
2:F:84:MET:SD	2:F:101:GLY:HA2	2.52	0.50
5:J:281:DG:H1'	5:J:282:DT:H5''	1.94	0.50
3:G:62:ILE:HD13	3:G:93:LEU:CD1	2.41	0.49
4:H:118:VAL:O	4:H:122:THR:HG22	2.12	0.49
5:I:77:DA:C2'	5:I:78:DG:O5'	2.60	0.49
3:C:67:GLY:O	3:C:70:ALA:HB3	2.13	0.49
3:G:21:ALA:HB2	4:H:121:TYR:HB2	1.94	0.49
4:H:52:THR:HG22	4:H:53:GLY:O	2.12	0.49
5:I:102:DA:H2''	5:I:103:DG:H8	1.78	0.49
5:I:79:DC:H2''	5:I:80:DT:C7	2.43	0.49
5:J:252:DT:C2'	5:J:253:DC:C5'	2.86	0.49
3:C:81:ARG:HG2	1:E:58:THR:HG21	1.94	0.49
5:I:61:DA:H2''	5:I:62:DT:H5'	1.94	0.49
5:I:7:DA:C2	5:J:287:DA:C2	3.00	0.49
2:B:98:TYR:CZ	3:G:100:VAL:HG11	2.48	0.49
5:I:55:DA:H2''	5:I:56:DA:O5'	2.11	0.49
5:J:232:DT:H2''	5:J:233:DG:H5'	1.94	0.49
4:H:99:ARG:HH11	4:H:99:ARG:HG2	1.76	0.49
5:J:224:DG:H2''	5:J:225:DC:C6	2.48	0.49
1:A:128:ARG:O	1:A:131:ARG:HB2	2.13	0.49
1:A:40:ARG:HG3	1:A:40:ARG:NH1	2.27	0.49
5:J:199:DC:H4'	5:J:199:DC:OP1	2.12	0.49
1:A:85:GLN:HG3	5:I:49:DC:OP2	2.13	0.49
3:C:87:ILE:HD13	3:C:97:LEU:CD1	2.42	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:H:40:TYR:O	4:H:44:VAL:HG23	2.13	0.49
4:D:30:LYS:N	5:I:104:DT:OP1	2.46	0.49
3:C:87:ILE:HD12	3:C:102:ILE:HD11	1.94	0.49
4:D:75:GLY:O	4:D:78:SER:N	2.46	0.49
3:G:102:ILE:N	3:G:102:ILE:HD12	2.28	0.49
4:D:42:TYR:O	4:D:43:LYS:C	2.51	0.48
5:I:111:DA:H2 ^{''}	5:I:112:DT:O5 [']	2.13	0.48
5:I:90:DT:H6	5:I:90:DT:H5 ^{''}	1.78	0.48
3:G:31:HIS:CE1	3:G:35:ARG:HD3	2.48	0.48
3:G:79:ILE:O	3:G:82:HIS:HB2	2.13	0.48
3:G:15:LYS:HB2	5:J:178:DT:OP1	2.13	0.48
3:G:78:ILE:HA	3:G:82:HIS:HD1	1.77	0.48
5:I:32:DT:H2 ^{''}	5:I:33:DG:O5 [']	2.12	0.48
4:D:94:ILE:O	4:D:98:VAL:HG23	2.14	0.48
1:E:134:ARG:HG2	1:E:134:ARG:HH11	1.79	0.48
5:J:164:DG:H8	5:J:164:DG:OP2	1.96	0.48
5:J:203:DA:C2 [']	5:J:204:DG:C8	2.97	0.48
5:J:235:DC:H2 ^{''}	5:J:236:DT:C5	2.49	0.48
5:I:24:DA:H2 ^{''}	5:I:25:DC:O5 [']	2.13	0.48
4:D:70:PHE:CD1	4:D:70:PHE:C	2.87	0.48
5:I:105:DT:H2 ^{''}	5:I:106:DT:O5 [']	2.14	0.48
5:I:136:DT:H2 ^{''}	5:I:137:DG:C4 [']	2.44	0.48
5:J:286:DT:H1 [']	5:J:287:DA:H5 [']	1.95	0.48
5:J:173:DA:H2	5:J:174:DA:C2	2.31	0.48
4:D:108:LYS:HE3	4:D:108:LYS:CA	2.43	0.48
1:E:64:LYS:NZ	1:E:90:MET:SD	2.80	0.48
3:G:103:ALA:O	3:G:104:GLN:HB2	2.13	0.48
3:G:79:ILE:H	3:G:82:HIS:HD1	1.62	0.48
3:G:42:ARG:HB2	4:H:88:THR:HB	1.96	0.48
1:A:110:CYS:SG	1:E:130:ILE:HD11	2.54	0.47
5:I:30:DA:H2 ^{''}	5:I:31:DG:OP2	2.13	0.47
5:J:202:DA:H2 ^{''}	5:J:203:DA:H8	1.78	0.47
5:J:214:DG:H2 ^{''}	5:J:215:DC:C6	2.49	0.47
5:I:4:DA:C2	5:J:290:DG:N2	2.82	0.47
4:H:102:LEU:HA	4:H:103:PRO:HD3	1.70	0.47
3:G:40:SER:HB3	4:H:89:ILE:HG13	1.96	0.47
5:I:80:DT:H2 ^{''}	5:I:81:DG:H8	1.76	0.47
5:J:251:DT:H2 ^{''}	5:J:252:DT:O5 [']	2.14	0.47
1:E:61:LEU:HD13	2:F:36:ARG:HB3	1.96	0.47
5:J:197:DA:H2 ^{''}	5:J:198:DT:H5 [']	1.97	0.47
5:J:241:DA:H2 ^{''}	5:J:242:DT:C5 [']	2.38	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:G:37:GLY:O	3:G:38:ASN:HB2	2.15	0.47
5:I:103:DG:H2''	5:I:104:DT:C5'	2.44	0.47
5:I:12:DC:H1'	5:I:13:DC:H5'	1.96	0.47
5:I:38:DT:H2''	5:I:39:DG:O4'	2.13	0.47
5:J:260:DC:H2''	5:J:261:DA:O5'	2.14	0.47
3:C:73:ASN:HB3	3:C:75:LYS:HZ3	1.80	0.47
4:D:105:GLU:OE2	4:D:105:GLU:HA	2.15	0.47
5:J:170:DA:C2'	5:J:171:DC:H5''	2.45	0.47
1:A:72:ARG:HH11	1:A:72:ARG:HG2	1.80	0.47
2:F:33:ALA:HA	2:F:36:ARG:NH2	2.29	0.47
4:H:103:PRO:O	4:H:105:GLU:N	2.48	0.47
5:I:103:DG:C4'	5:I:103:DG:OP1	2.59	0.47
5:I:106:DT:H4'	5:I:106:DT:OP1	2.15	0.47
5:I:113:DA:C2	5:J:181:DA:C2	3.02	0.47
5:I:82:DA:H1'	5:I:83:DA:H5''	1.97	0.47
5:J:237:DT:C2'	5:J:238:DT:H5'	2.24	0.47
5:J:275:DC:H2''	5:J:276:DT:H6	1.78	0.47
1:A:72:ARG:NH1	1:A:72:ARG:HG2	2.29	0.47
1:E:63:ARG:HH11	1:E:63:ARG:H	1.62	0.47
2:F:78:ARG:HD2	5:I:101:DC:H5'	1.96	0.47
5:I:139:DA:OP1	5:I:139:DA:H4'	2.14	0.47
5:I:17:DA:OP1	5:I:17:DA:H4'	2.15	0.47
4:D:94:ILE:O	4:D:97:ALA:HB3	2.15	0.47
1:E:128:ARG:HD2	1:E:133:GLU:OE1	2.15	0.47
5:J:229:DA:H2''	5:J:230:DC:H5''	1.97	0.47
2:F:18:HIS:N	2:F:18:HIS:ND1	2.62	0.47
5:I:129:DC:O2	5:I:130:DT:N3	2.48	0.47
5:J:245:DA:H2''	5:J:246:DG:C8	2.50	0.47
1:E:108:ASN:HB2	2:F:43:VAL:HG22	1.97	0.46
5:I:122:DG:H2''	5:I:123:DT:O5'	2.14	0.46
5:I:143:DT:H1'	5:I:144:DG:C8	2.50	0.46
1:E:134:ARG:HD3	1:E:134:ARG:C	2.34	0.46
5:J:243:DG:C6	5:J:244:DG:C6	3.04	0.46
4:D:123:SER:O	4:D:124:ALA:HB3	2.14	0.46
1:E:37:LYS:HE3	5:I:5:DA:C4'	2.46	0.46
4:H:80:LEU:HD23	4:H:81:ALA:N	2.31	0.46
5:I:45:DT:H2''	5:I:46:DG:C8	2.50	0.46
1:A:85:GLN:HA	5:I:49:DC:OP2	2.16	0.46
1:A:70:LEU:O	1:A:74:ILE:HG13	2.16	0.46
3:C:66:ALA:HA	3:C:86:ALA:HB2	1.98	0.46
1:A:117:VAL:HG13	1:A:117:VAL:O	2.15	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:96:CYS:SG	2:B:58:LEU:HD11	2.56	0.46
5:J:204:DG:N2	5:J:205:DG:C2	2.84	0.46
1:A:97:GLU:HG2	2:B:37:LEU:HD21	1.98	0.46
5:J:220:DT:H4'	5:J:220:DT:OP1	2.16	0.46
5:J:271:DG:H2''	5:J:272:DA:H5'	1.97	0.46
3:C:30:VAL:CG1	3:C:51:LEU:HD23	2.43	0.46
5:I:134:DG:H2''	5:I:135:DG:OP2	2.15	0.46
5:I:99:DA:C2'	5:I:100:DG:O5'	2.62	0.46
1:A:108:ASN:O	1:A:112:ILE:HG13	2.14	0.46
5:I:16:DC:H2''	5:I:17:DA:C4	2.51	0.46
5:I:25:DC:H2''	5:I:26:DC:C6	2.50	0.46
5:I:62:DT:H2''	5:I:63:DG:C8	2.51	0.46
5:J:257:DA:C8	5:J:258:DT:H72	2.51	0.46
3:G:62:ILE:CD1	3:G:93:LEU:HD13	2.45	0.46
5:J:166:DT:H2''	5:J:167:DT:C6	2.51	0.46
1:A:84:PHE:CD1	2:B:81:VAL:HB	2.51	0.46
5:J:256:DA:C1'	5:J:257:DA:H5''	2.43	0.46
3:C:37:GLY:HA3	3:C:39:TYR:CE2	2.51	0.45
3:C:75:LYS:HE2	3:C:82:HIS:HE2	1.81	0.45
5:I:136:DT:C3'	5:I:137:DG:C5'	2.93	0.45
5:J:149:DC:N4	5:J:150:DA:H62	2.13	0.45
5:J:218:DA:H1'	5:J:219:DA:C5'	2.45	0.45
5:J:277:DG:C1'	5:J:278:DC:H5'	2.43	0.45
3:C:29:ARG:HH21	4:D:40:TYR:HE2	1.63	0.45
5:I:38:DT:C4'	5:I:38:DT:OP1	2.62	0.45
5:I:75:DT:H5''	5:I:75:DT:H6	1.82	0.45
5:I:83:DA:H2''	5:I:84:DC:C5'	2.46	0.45
4:D:112:SER:OG	4:D:113:GLU:N	2.49	0.45
5:I:117:DT:H2''	5:I:118:DT:O5'	2.17	0.45
5:J:167:DT:H2''	5:J:168:DC:OP1	2.15	0.45
5:J:229:DA:H2''	5:J:230:DC:C5'	2.46	0.45
5:J:229:DA:H1'	5:J:230:DC:H5''	1.98	0.45
3:C:62:ILE:HD13	3:C:93:LEU:CD1	2.40	0.45
4:D:111:VAL:O	4:D:112:SER:C	2.55	0.45
4:D:39:ILE:HG22	4:D:40:TYR:CD1	2.51	0.45
3:C:40:SER:OG	4:D:89:ILE:HG13	2.17	0.45
3:C:77:ARG:O	3:C:79:ILE:HG23	2.17	0.45
4:D:44:VAL:O	4:D:47:GLN:HB2	2.16	0.45
3:G:41:GLU:HG2	3:G:42:ARG:HG3	1.98	0.45
5:J:263:DT:C2'	5:J:264:DT:H72	2.46	0.45
2:B:36:ARG:O	2:B:39:ARG:HB2	2.17	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:49:LEU:O	2:F:50:ILE:C	2.55	0.45
3:G:102:ILE:HG23	4:H:61:ILE:CD1	2.35	0.45
5:J:180:DT:H2''	5:J:181:DA:OP2	2.17	0.45
4:D:48:VAL:CG2	4:D:49:HIS:N	2.80	0.45
4:H:103:PRO:O	4:H:106:LEU:N	2.50	0.45
5:I:121:DG:H2''	5:I:122:DG:C8	2.52	0.45
5:I:46:DG:H1'	5:I:47:DC:C6	2.51	0.45
4:D:79:ARG:HB3	4:D:79:ARG:NH1	2.31	0.45
1:E:60:LEU:HD12	1:E:64:LYS:HZ3	1.82	0.45
5:J:221:DT:H2''	5:J:222:DC:C5'	2.36	0.45
5:I:21:DT:O2	5:J:273:DA:H2	2.00	0.45
4:D:108:LYS:HE3	4:D:108:LYS:HA	1.99	0.45
1:E:74:ILE:HD12	2:F:62:LEU:HD13	1.99	0.45
2:B:98:TYR:CD1	4:H:64:SER:HB3	2.52	0.45
4:H:94:ILE:O	4:H:98:VAL:HG23	2.17	0.45
3:C:42:ARG:HB2	4:D:88:THR:CB	2.35	0.45
5:I:59:DG:H2''	5:I:60:DC:C6	2.52	0.45
5:I:78:DG:H2''	5:I:79:DC:C6	2.48	0.45
3:C:73:ASN:HD22	3:C:75:LYS:NZ	2.14	0.44
4:D:42:TYR:O	4:D:45:LEU:N	2.50	0.44
3:G:90:ASP:OD2	3:G:93:LEU:HG	2.18	0.44
5:J:173:DA:C2	5:J:174:DA:N1	2.85	0.44
1:A:63:ARG:CZ	1:A:63:ARG:HB2	2.48	0.44
1:A:76:GLN:HE22	1:A:81:ASP:H	1.64	0.44
3:G:47:ALA:N	3:G:48:PRO:CD	2.80	0.44
5:J:150:DA:H2	5:J:151:DA:N6	2.13	0.44
4:D:36:SER:OG	4:D:37:TYR:N	2.51	0.44
5:J:198:DT:H2''	5:J:199:DC:O5'	2.16	0.44
3:C:112:GLN:HB2	3:C:115:LEU:HG	1.98	0.44
4:D:79:ARG:CB	4:D:79:ARG:NH1	2.80	0.44
5:I:100:DG:H2''	5:I:101:DC:C5	2.53	0.44
3:G:79:ILE:HG12	3:G:82:HIS:ND1	2.32	0.44
2:F:79:LYS:N	5:I:101:DC:OP1	2.28	0.44
5:J:149:DC:N3	5:J:150:DA:N7	2.66	0.44
1:A:118:THR:OG1	2:B:45:ARG:HD3	2.18	0.44
3:G:42:ARG:HB2	3:G:42:ARG:HH11	1.82	0.44
5:I:106:DT:C2'	5:I:107:DC:C5'	2.84	0.44
5:J:287:DA:H1'	5:J:288:DT:H5'	2.00	0.44
4:D:73:ILE:HD13	4:D:98:VAL:HG22	2.00	0.44
3:G:21:ALA:CB	4:H:121:TYR:HB2	2.47	0.44
5:I:2:DT:H6	5:I:2:DT:O5'	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:I:38:DT:H2''	5:I:39:DG:H5'	2.00	0.44
5:I:83:DA:H2''	5:I:84:DC:H5'	1.98	0.44
5:J:202:DA:C4'	5:J:202:DA:OP1	2.63	0.44
5:J:237:DT:C2'	5:J:238:DT:C5'	2.92	0.44
5:I:93:DT:C4'	5:I:94:DG:OP1	2.65	0.44
5:J:165:DA:C2'	5:J:166:DT:H71	2.48	0.44
5:J:243:DG:OP1	5:J:243:DG:C4'	2.64	0.44
1:A:119:ILE:HG13	2:B:50:ILE:CD1	2.48	0.43
2:B:75:HIS:CE1	4:D:80:LEU:HD22	2.53	0.43
3:C:112:GLN:HB2	3:C:115:LEU:CD1	2.48	0.43
4:D:76:GLU:OE2	4:D:79:ARG:NH2	2.50	0.43
4:H:68:ASP:O	4:H:72:ARG:HG3	2.18	0.43
5:J:275:DC:C2'	5:J:276:DT:C6	3.01	0.43
3:C:32:ARG:HD3	5:I:29:DA:OP2	2.18	0.43
3:C:41:GLU:OE2	3:C:41:GLU:N	2.50	0.43
3:C:64:GLU:O	4:D:49:HIS:HE1	2.00	0.43
5:I:115:DA:H1'	5:I:116:DC:H5'	2.00	0.43
2:B:97:LEU:HD11	3:G:103:ALA:HB2	2.00	0.43
3:C:62:ILE:CD1	3:C:93:LEU:HD13	2.38	0.43
3:G:79:ILE:HB	3:G:80:PRO:CD	2.48	0.43
5:J:245:DA:H2''	5:J:246:DG:O5'	2.18	0.43
2:B:96:THR:HG22	3:G:100:VAL:HG13	2.01	0.43
5:I:132:DC:C6	5:I:133:DA:N7	2.86	0.43
2:F:68:ASP:OD2	2:F:92:ARG:HD3	2.18	0.43
4:H:52:THR:HG22	4:H:53:GLY:N	2.34	0.43
5:I:71:DG:H2''	5:I:72:DA:OP2	2.17	0.43
5:J:280:DG:H2''	5:J:281:DG:OP2	2.19	0.43
2:B:75:HIS:C	2:B:77:LYS:H	2.21	0.43
4:D:48:VAL:HG23	4:D:49:HIS:N	2.33	0.43
4:H:68:ASP:O	4:H:71:GLU:HB3	2.19	0.43
5:I:67:DA:H2''	5:I:68:DG:O4'	2.19	0.43
2:B:100:PHE:N	2:B:100:PHE:CD1	2.86	0.43
3:G:32:ARG:HH11	3:G:36:LYS:HZ1	1.65	0.43
5:I:19:DA:H2''	5:I:20:DT:O5'	2.18	0.43
5:J:220:DT:C2'	5:J:221:DT:C5'	2.86	0.43
2:B:25:ASN:C	2:B:27:GLN:N	2.72	0.43
3:C:90:ASP:O	3:C:91:GLU:C	2.57	0.43
2:F:100:PHE:CD1	2:F:100:PHE:N	2.86	0.43
3:G:18:SER:HA	3:G:27:VAL:CG2	2.48	0.43
3:G:42:ARG:NH2	5:I:111:DA:O4'	2.52	0.43
5:I:11:DA:H2''	5:I:12:DC:O5'	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:I:45:DT:H6	5:I:45:DT:H5'	1.84	0.43
5:J:157:DA:H2''	5:J:158:DC:C5	2.54	0.43
5:J:158:DC:O5'	5:J:158:DC:H2'	2.19	0.43
2:B:66:ILE:O	2:B:67:ARG:C	2.57	0.43
1:E:111:ALA:O	1:E:114:ALA:HB3	2.19	0.43
4:H:112:SER:OG	4:H:113:GLU:N	2.52	0.43
2:F:77:LYS:HG3	4:H:92:ARG:HH22	1.83	0.43
5:I:106:DT:H2''	5:I:107:DC:H5''	1.95	0.43
5:J:255:DA:C2	5:J:256:DA:C2	3.07	0.43
4:D:79:ARG:CB	4:D:79:ARG:HH11	2.31	0.43
3:G:79:ILE:HG12	3:G:82:HIS:CE1	2.54	0.43
5:I:110:DA:H2''	5:I:111:DA:OP2	2.18	0.43
5:I:133:DA:C2	5:J:161:DG:N2	2.86	0.43
5:I:19:DA:C2	5:I:20:DT:C2	3.07	0.43
5:J:177:DG:H2''	5:J:178:DT:H5''	1.98	0.43
5:I:120:DT:H2''	5:I:121:DG:OP2	2.19	0.42
5:I:132:DC:N4	5:I:133:DA:N6	2.66	0.42
5:J:288:DT:H1'	5:J:289:DT:H5''	2.00	0.42
2:B:75:HIS:CD2	4:D:96:THR:OG1	2.61	0.42
3:C:112:GLN:HG3	1:E:112:ILE:CD1	2.49	0.42
3:G:32:ARG:CG	3:G:36:LYS:HE3	2.48	0.42
3:G:31:HIS:CD2	3:G:48:PRO:HG2	2.54	0.42
4:H:101:LEU:HD13	4:H:101:LEU:HA	1.87	0.42
4:H:108:LYS:O	4:H:111:VAL:N	2.52	0.42
5:I:75:DT:C2'	5:I:76:DC:H5'	2.46	0.42
5:J:179:DG:OP1	5:J:179:DG:H4'	2.19	0.42
5:J:218:DA:H2''	5:J:219:DA:H5'	2.00	0.42
1:A:56:LYS:HE3	1:A:56:LYS:HB2	1.89	0.42
3:C:17:ARG:HH22	3:C:31:HIS:CG	2.37	0.42
3:C:49:VAL:CG1	4:D:118:VAL:HA	2.42	0.42
2:F:78:ARG:HB2	2:F:78:ARG:HH11	1.84	0.42
4:H:63:ASN:O	4:H:64:SER:C	2.56	0.42
5:I:16:DC:H2''	5:I:17:DA:N9	2.34	0.42
5:I:6:DT:OP1	5:I:6:DT:H4'	2.19	0.42
1:E:69:ARG:NH2	5:I:90:DT:OP2	2.44	0.42
5:J:195:DC:H1'	5:J:196:DC:C6	2.55	0.42
1:A:92:LEU:O	1:A:96:CYS:HB2	2.19	0.42
3:G:76:THR:O	4:H:52:THR:HG23	2.19	0.42
5:J:186:DG:H1'	5:J:187:DA:N7	2.34	0.42
4:H:86:ARG:HH12	5:J:186:DG:H3'	1.85	0.42
5:J:229:DA:C2'	5:J:230:DC:H5''	2.49	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:J:236:DT:H2''	5:J:237:DT:O5'	2.18	0.42
5:J:245:DA:C2'	5:J:246:DG:C8	3.02	0.42
1:A:96:CYS:SG	2:B:58:LEU:HD12	2.60	0.42
3:G:62:ILE:HG13	4:H:65:PHE:CE1	2.55	0.42
4:H:71:GLU:O	4:H:71:GLU:OE1	2.37	0.42
5:I:113:DA:H1'	5:I:114:DC:C5'	2.46	0.42
5:J:279:DA:OP1	5:J:279:DA:C4'	2.68	0.42
1:E:134:ARG:NH1	1:E:135:ALA:O	2.53	0.42
5:J:156:DC:H2''	5:J:157:DA:OP2	2.19	0.42
5:J:189:DA:H4'	5:J:189:DA:OP1	2.20	0.42
5:J:290:DG:H2''	5:J:291:DA:OP2	2.20	0.42
1:A:40:ARG:HH11	1:A:40:ARG:HG3	1.84	0.42
3:C:71:ARG:NH2	4:D:51:ASP:OD2	2.53	0.42
1:E:63:ARG:NH1	1:E:63:ARG:H	2.17	0.42
5:J:257:DA:H1'	5:J:258:DT:C5'	2.50	0.42
2:B:37:LEU:HA	2:B:37:LEU:HD23	1.84	0.42
3:C:76:THR:HG23	5:J:278:DC:OP2	2.20	0.42
3:G:29:ARG:O	3:G:30:VAL:C	2.58	0.42
5:J:170:DA:H2''	5:J:171:DC:H5''	2.01	0.42
5:J:238:DT:C1'	5:J:239:DT:H5''	2.44	0.42
2:B:60:VAL:CG1	2:B:64:ASN:HD21	2.23	0.42
1:E:72:ARG:HH11	1:E:72:ARG:HG2	1.85	0.42
5:I:7:DA:OP1	5:I:7:DA:H4'	2.19	0.42
5:I:89:DC:H1'	5:I:90:DT:C5	2.54	0.42
3:C:80:PRO:HD3	4:D:58:ALA:HB2	2.01	0.41
1:E:116:ARG:NH1	1:E:120:MET:HG3	2.35	0.41
1:E:134:ARG:NH1	1:E:134:ARG:HG2	2.33	0.41
3:G:17:ARG:HA	3:G:20:ARG:HB3	2.02	0.41
5:I:75:DT:H2''	5:I:76:DC:O5'	2.20	0.41
3:C:81:ARG:HG2	1:E:58:THR:CG2	2.50	0.41
4:H:119:THR:CA	4:H:122:THR:HG22	2.49	0.41
5:I:47:DC:N4	5:J:245:DA:H62	2.17	0.41
5:J:247:DC:C4'	5:J:247:DC:OP1	2.61	0.41
1:A:113:HIS:CG	1:E:126:LEU:HD22	2.56	0.41
3:C:103:ALA:O	3:C:104:GLN:CB	2.64	0.41
3:G:77:ARG:HB3	5:I:131:DG:OP1	2.20	0.41
5:J:174:DA:C2	5:J:175:DA:C2	3.09	0.41
3:C:15:LYS:CB	3:C:20:ARG:HH12	2.29	0.41
3:C:73:ASN:O	3:C:74:LYS:HB2	2.20	0.41
4:H:80:LEU:O	4:H:83:TYR:HB2	2.20	0.41
5:I:28:DA:OP1	5:I:28:DA:H4'	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:50:ILE:HG22	2:B:51:TYR:N	2.35	0.41
5:I:97:DG:C5	5:I:98:DG:C6	3.09	0.41
4:D:57:LYS:HB2	4:D:57:LYS:HE3	1.90	0.41
4:H:99:ARG:NH1	4:H:99:ARG:HG2	2.35	0.41
5:I:120:DT:H2'	5:I:120:DT:H6	1.64	0.41
5:J:234:DC:C2'	5:J:235:DC:H5'	2.32	0.41
5:I:9:DC:O2	5:J:285:DA:C2	2.74	0.41
4:D:118:VAL:HG12	4:D:119:THR:N	2.35	0.41
1:A:134:ARG:CZ	1:A:134:ARG:HB3	2.49	0.41
3:G:85:LEU:HD23	3:G:108:LEU:CD2	2.51	0.41
5:I:42:DA:H2''	5:I:43:DA:O5'	2.21	0.41
5:I:46:DG:C6	5:J:246:DG:O6	2.74	0.41
1:E:43:PRO:HA	5:I:82:DA:C5'	2.51	0.41
5:I:7:DA:H2''	5:I:8:DT:O5'	2.21	0.41
4:H:88:THR:CG2	5:J:186:DG:OP1	2.68	0.41
5:J:249:DG:H1'	5:J:250:DT:H5''	2.03	0.41
5:I:137:DG:C2'	5:I:138:DG:C8	3.00	0.41
5:J:224:DG:OP1	5:J:224:DG:H4'	2.20	0.41
4:D:33:ARG:HH12	5:J:269:DT:H4'	1.82	0.41
1:A:96:CYS:O	1:A:99:TYR:HB3	2.21	0.41
2:B:70:VAL:O	2:B:73:THR:HB	2.20	0.41
3:C:95:LYS:HD3	3:C:95:LYS:O	2.20	0.41
1:E:42:ARG:CG	1:E:42:ARG:NH1	2.72	0.41
3:G:24:GLN:HE22	4:H:43:LYS:HD3	1.86	0.41
3:G:26:PRO:O	3:G:30:VAL:HG23	2.21	0.41
5:J:164:DG:H2''	5:J:165:DA:O5'	2.20	0.41
5:J:242:DT:H2''	5:J:243:DG:O5'	2.21	0.41
5:J:257:DA:H1'	5:J:258:DT:H5''	2.03	0.41
5:J:277:DG:H2''	5:J:278:DC:H6	1.86	0.41
1:A:63:ARG:HH11	1:A:63:ARG:N	1.96	0.41
2:B:60:VAL:O	2:B:64:ASN:ND2	2.54	0.41
1:E:53:ARG:NH1	1:E:54:TYR:CE1	2.89	0.41
5:I:127:DA:H2''	5:I:128:DT:O5'	2.19	0.41
4:D:72:ARG:HB3	4:D:101:LEU:HD11	2.02	0.40
4:D:75:GLY:O	4:D:78:SER:HB3	2.21	0.40
1:A:108:ASN:HD21	3:G:115:LEU:HD11	1.86	0.40
2:F:78:ARG:CD	5:I:101:DC:H5'	2.52	0.40
5:J:191:DT:C2'	5:J:192:DG:C8	2.99	0.40
5:J:195:DC:O5'	5:J:195:DC:H2'	2.21	0.40
5:J:256:DA:C2'	5:J:257:DA:H5''	2.51	0.40
1:E:118:THR:HA	2:F:45:ARG:HB3	2.02	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:I:44:DC:H1'	5:I:45:DT:H5''	2.04	0.40
5:J:207:DA:C2'	5:J:208:DT:H71	2.40	0.40
3:G:26:PRO:HB2	3:G:29:ARG:HB3	2.03	0.40
1:A:63:ARG:NH2	2:B:30:THR:HG23	2.36	0.40
1:E:63:ARG:HB3	1:E:66:PRO:HD2	2.03	0.40
2:F:29:ILE:HG13	2:F:58:LEU:HD23	2.03	0.40
2:F:62:LEU:O	2:F:63:GLU:C	2.59	0.40
3:G:60:ALA:O	3:G:61:GLU:C	2.60	0.40
4:H:69:ILE:O	4:H:70:PHE:C	2.59	0.40
5:J:208:DT:H2''	5:J:209:DG:C8	2.57	0.40
4:D:69:ILE:HD12	4:D:69:ILE:N	2.37	0.40
1:E:69:ARG:HH22	5:I:90:DT:P	2.44	0.40
5:I:36:DT:C2	5:I:37:DT:C6	3.10	0.40
5:I:4:DA:H2''	5:I:5:DA:OP2	2.22	0.40
5:I:69:DC:N4	5:J:223:DA:N6	2.69	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	95/139 (68%)	88 (93%)	7 (7%)	0	100	100
1	E	97/139 (70%)	93 (96%)	3 (3%)	1 (1%)	17	57
2	B	76/106 (72%)	68 (90%)	8 (10%)	0	100	100
2	F	82/106 (77%)	68 (83%)	13 (16%)	1 (1%)	14	53
3	C	104/133 (78%)	90 (86%)	13 (12%)	1 (1%)	17	57
3	G	102/133 (77%)	86 (84%)	13 (13%)	3 (3%)	5	34
4	D	93/129 (72%)	72 (77%)	19 (20%)	2 (2%)	7	40
4	H	90/129 (70%)	77 (86%)	12 (13%)	1 (1%)	16	56

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
All	All	739/1014 (73%)	642 (87%)	88 (12%)	9 (1%)	14 53

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	H	104	GLY
4	D	55	SER
4	D	104	GLY
3	C	104	GLN
1	E	64	LYS
2	F	50	ILE
3	G	106	GLY
3	G	48	PRO
3	G	114	VAL

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	85/113 (75%)	77 (91%)	8 (9%)	9 37
1	E	86/113 (76%)	78 (91%)	8 (9%)	10 38
2	B	63/81 (78%)	60 (95%)	3 (5%)	28 63
2	F	70/81 (86%)	67 (96%)	3 (4%)	32 66
3	C	84/102 (82%)	76 (90%)	8 (10%)	9 37
3	G	83/102 (81%)	77 (93%)	6 (7%)	16 49
4	D	81/107 (76%)	76 (94%)	5 (6%)	20 55
4	H	78/107 (73%)	74 (95%)	4 (5%)	26 61
All	All	630/806 (78%)	585 (93%)	45 (7%)	16 50

All (45) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	42	ARG

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Mol	Chain	Res	Type
1	A	53	ARG
1	A	59	GLU
1	A	63	ARG
1	A	80	THR
1	A	117	VAL
1	A	120	MET
1	A	134	ARG
2	B	35	ARG
2	B	50	ILE
2	B	78	ARG
3	C	76	THR
3	C	77	ARG
3	C	81	ARG
3	C	99	ARG
3	C	101	THR
3	C	108	LEU
3	C	110	ASN
3	C	118	LYS
4	D	33	ARG
4	D	34	LYS
4	D	80	LEU
4	D	88	THR
4	D	108	LYS
1	E	42	ARG
1	E	59	GLU
1	E	63	ARG
1	E	80	THR
1	E	81	ASP
1	E	120	MET
1	E	133	GLU
1	E	134	ARG
2	F	18	HIS
2	F	93	GLN
2	F	96	THR
3	G	17	ARG
3	G	72	ASP
3	G	75	LYS
3	G	81	ARG
3	G	97	LEU
3	G	118	LYS
4	H	88	THR
4	H	93	GLU

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Mol	Chain	Res	Type
4	H	101	LEU
4	H	112	SER

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (24) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	113	HIS
1	A	122	GLN
2	B	64	ASN
2	B	75	HIS
3	C	24	GLN
3	C	73	ASN
3	C	84	GLN
3	C	104	GLN
4	D	49	HIS
4	D	63	ASN
1	E	39	HIS
1	E	108	ASN
1	E	113	HIS
1	E	122	GLN
2	F	27	GLN
2	F	64	ASN
2	F	75	HIS
2	F	93	GLN
3	G	24	GLN
3	G	31	HIS
3	G	68	ASN
3	G	73	ASN
3	G	84	GLN
4	H	63	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

5.6 Ligand geometry [i](#)

Of 15 ligands modelled in this entry, 15 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	97/139 (69%)	-0.49	0 100 100	12, 36, 69, 103	0
1	E	99/139 (71%)	-0.49	1 (1%) 82 77	11, 30, 65, 115	0
2	B	78/106 (73%)	-0.62	0 100 100	12, 33, 57, 96	0
2	F	84/106 (79%)	-0.62	0 100 100	12, 29, 55, 84	0
3	C	106/133 (79%)	-0.55	1 (0%) 84 78	13, 32, 72, 91	0
3	G	104/133 (78%)	-0.49	1 (0%) 82 77	14, 41, 76, 109	0
4	D	95/129 (73%)	-0.49	1 (1%) 80 74	18, 36, 85, 136	0
4	H	92/129 (71%)	-0.49	0 100 100	16, 41, 67, 85	0
5	I	145/146 (99%)	0.16	2 (1%) 75 69	41, 93, 140, 196	0
5	J	145/146 (99%)	0.02	0 100 100	40, 96, 138, 155	0
All	All	1045/1306 (80%)	-0.35	6 (0%) 89 85	11, 43, 125, 196	0

All (6) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	37	LYS	3.4
4	D	31	ARG	2.8
5	I	105	DT	2.5
5	I	104	DT	2.3
3	C	13	LYS	2.2
3	G	118	LYS	2.1

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
7	MN	I	1001	1/1	0.50	0.28	118,118,118,118	0
7	MN	I	1005	1/1	0.70	0.18	108,108,108,108	0
7	MN	I	1006	1/1	0.80	0.11	105,105,105,105	0
7	MN	I	1002	1/1	0.86	0.10	99,99,99,99	0
7	MN	J	1001	1/1	0.89	0.10	94,94,94,94	0
7	MN	J	1003	1/1	0.90	0.15	67,67,67,67	0
6	CL	E	1001	1/1	0.93	0.27	74,74,74,74	0
7	MN	I	1004	1/1	0.93	0.09	59,59,59,59	0
7	MN	J	1005	1/1	0.94	0.12	108,108,108,108	0
7	MN	J	1004	1/1	0.95	0.18	48,48,48,48	0
7	MN	I	1003	1/1	0.96	0.22	70,70,70,70	0
7	MN	J	1002	1/1	0.97	0.16	94,94,94,94	0
6	CL	G	1001	1/1	0.97	0.18	46,46,46,46	0
6	CL	C	1001	1/1	0.97	0.11	48,48,48,48	0
7	MN	D	201	1/1	0.99	0.25	46,46,46,46	0

6.5 Other polymers [i](#)

There are no such residues in this entry.